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No. 908

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ROUND-TABLE DISCUSSION OF ANCILLARY PRODUCTION

Application of a Broader Approach

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO)
in Russian No 10, Oct 79 pp 36-54

[Discussion: "Look from Broader Positions"]

> [Text] Around the round table of EKO [Ekonomika i organizatsiya promyshlennogo proizvodstva--Economics and Organization of Industrial Production], scientists, heads and leading specialists of large production and scientific-research associations and enterprises, planning and scientific-research institutes, ministries and departments met on problems of ancillary and service production. The discussion was led by Academician A.G. Aganvegyan, the journal's chief editor.

The Service Sphere of Production Today and Tomorrow

[A.G. Aganbegyan] Turning to problems of servicing of production, we would like to look at them from broader positions. The chief problem of the country's economic life is the problem of sources of economic growth. In order to undertake intensive development, it will be necessary to find those points of efficiency in the national economy, those threads, which when pulled, would radically improve the economy's processes of development.

One of the directions that could produce in a relatively short period of time an effect while involving less capital investment than other alternative directions is improvement of servicing of production. In industry, about 50 percent of the workers are engaged in ancillary services, the main share of manual labor--in auxiliary work. Why does the production service sphere continue to grow? Why is it slow in undertaking industrialization? This is what we must deal with.

It cannot be said that we lack in the country interesting experience in the improvement of technical servicing of production. We are acquainted with the achievements of many enterprises of the Ministry of Tractor and Agricultural Machine Building, Ministry of Automotive Industry, including such of our giants as Moscow Motor-Vehicle Plant imeni I.A. Likhachev, Volga Motor-Vehicle Plant imeni 50-Letiye SSSR, Gor'kiy Motor-Vehicle Plant, Kama Motor-Vehicle Plant, and others. It therefore should be possible to advance while utilizing available experience.

The problem of centralization, specialization and concentration of ancillary services is very important. Is it possible to put servicing functions outside the confines of an industrial enterprise? The creation of an industry of work services would correspond to the economics of our scale. We propose to discuss these problems.

[A.K. Osipov, deputy chief of the Department of Organization of Norm Setting and Productivity of Labor of the State Committee for Labor and Social Problems, Moscow] In speaking of the improving of servicing production facilities and their specialization and centralization, we cannot but help deal with the problems of managing an enterprise as a whole. We are rather intensely engaged in the management of industry and sectors and the creation of associations. When shall we actually examine the scheme of management and the organizational structure of the enterprise itself?

The shop structure in plants remains as before, auxiliary shops remain as before. At most plants, the shop is an enterprise within an enterprise from the point of view of organization of servicing of production. It has its own repair facilities, tool section and power service...

I ought to say that the Volga Motor-Vehicle Plant, where I worked from the time of its construction to 1978, started with the creation of a modern organizational structure. Had this not been the case, the Volga Motor-Vehicle Plant would have hardly assumed the advanced positions that it now occupies.

Centralization of all functional subdivisions, that is, services, which are engaged in management of production processes, should be provided for by the organizational structure of a plant. If the production-control department (I am speaking of a machine-building enterprise) provides for the day, for the month and then exercises control over its fulfillment, it itself should then plan for each subdivision everything that would be required for this program and provide for delivery of materials going to each work place. Repair services and transport-warehousing operations should function according to such a scheme.

In the planning of new enterprises, it is necessary to resolve questions comprehensively and to work up an organizational part. It practically is not to be found in plans today.

[V.S. Konovalov, head of a department of the All-Union Scientific-Research Institute of Materials-Handling Machine Building, Moscow] The present position of ancillary services is the result of a long-term wrong attitude toward them on the operate of operational heads and, let us be frank, to some extent scientists. Operational heads, being first and foremost concerned with plan fulfillment, have tried to achieve this at any price. No one was interested in how stampings were turned over for working or assembly. From this stem defects in warehousing, transport and the like. All capital investments were spent on the development of fixed production capacities. Very many examples exist where production capacities built for ancillary services and plant transport for them, were turned over to the main shops in proportion to their readiness.

It appears to me that paradoxical as it may seem problems of organization of production at the enterprise in the '30s were given more attention than today. During the years of the First Five-Year Plan there was such a thing as Orgmetall. It provided the foundation for organization of production in machine building. Today each sector has planning-technological institutes which perform this work in accordance with their resources and capabilities. But there is no coordination center. We do not have a scientific-research institute dealing with questions of organization of production.

[D.D. Karpov, doctor of economic sciences, head of the Department of Organization of Production Processes of the All-Union Scientific-Research Institute of Standardization, Moscow] About 10 years ago, there was to be observed in scientific researches the active working of problems of economics and organization of auxiliary production. Their results were adopted. But in recent years, there has been noted a decline in interest toward these problems. Nonetheless, two sectors exist which have been engaged and continue to be seriously engaged in problems of auxiliary production, and they have many positive solutions. I am speaking of the Ministry of Automotive Industry and the Ministry of Tractor and Agricultural Machine Building.

Before going on to the improvement of technical servicing of production, it is necessary to conduct an economic analysis of its state. At the present time no standardized criteria exist by means of which it would be possible to evaluate the level of organization of ancillary work and no system of economic indicators exists with which it would be possible to predict the development of these services.

In tractor and agricultural machine building a method has been developed of assessing the level of this work for the sector. Thus for the organization of materials-handling services the relation of of freight turnover to the volume of commodity production is meaningful. How many tons of foreign freight are there to 1,000 rubles of production? Calculations show: at unit-making plants--2.5-4 tons and tractor plants up to 15 tons. It is perfectly clear that the forms of organization of transport-warehousing work would differ in one case from the other.

Next the number of transport workers in the sector was analyzed. It turned out that some plants only included personnel of transport shops. But the number of ancillary workers within the main shops was not counted. In a shop, a worker is not designated as a transporter but is called a distributor. What does he do? He hauls parts from one machine tool to another, from one operation to another. If everybody were counted, there would be a lot more transporters. There has already been created a standardized method of accounting of persons employed in transport-warehousing and materials-handling operations.

If we are going to engage in the improvement of servicing production, it would be necessary to start with an economic analysis and with the development of criteria of assessing their levels.

[I.M. Zhislin, chief of the Economics Laboratory of the Kaprolaktam Production Association, Dzerzhinsk] We are convinced on the basis of our own experience: there is a need for an exhaustive and objective analysis prior to making a decision on what scheme of organization of ancillary production operations should be adopted. The sector conducted in our association an experiment on the centralization of engineering services. The aim was to centralize technical servicing and repair of fixed capital and power provision of production. However, there was insufficient preliminary economic substantiation. They worked for two years and then rejected such centralization. On studying our resources, all the pluses and minuses, we came to the conclusion that we were not ready for full centralization of engineering services and that we should limit ourselves to the centralization of maintenance production. This was approached in a sound manner, with preliminary calculations being carried out.

Chemical production operates under conditions of a rigid technological connection of shops and, as a rule, without repairs involving stoppages; it deals with aggressive media. A proportion of repair workers have to be in the main shops for the elimination of possible problems and prevention of breakdowns. For this reason we united about 65 percent of the repair personnel into a centralized repair production service with specialization of repair work according to types of equipment; we returned the remaining personnel to the shops, as complete centralization and territorial isolation of the shops made it difficult for repair workers to get around.

[A.K. Osipov] Comrade Zhislin states that if the services are dispersed territorially, then with centralization it is difficult to maneuver about. Centralization does not mean getting these services out of the chief subdivisions. They remain there, but the repair facilities and tool sectors existing in the shops have to be subordinated to the proper functional services.

Today a technical base for ancillary production does not exist because of a lack of resources but rather because no one is seriously engaged in its establishment: all the repair subdivisions are scattered throught the shops.

Practically, we could, without requiring significant capital investment, find in the immediate years ahead a sizeable quantity of labor and other resources only through an improvement in the organization of servicing production operations.

[F.D. Vydra, candidate of technical sciences, senior scientific associate of the Central Scientific-Research Institute of Comprehensive Automation of the Ministry of Instrument Making, Automation Equipment and Control systems, Moscow] There is no such thing as a free lunch. The assertion that everything can be achieved through simple organizational reorganization of technical servicing of production is wrong. Any reorganization results in temporary difficulties and tension. I believe it would be more accurate to simply say that it is necessary. It is necessary to first consider what is more beneficial and from where to begin the reorganization to raise the effectiveness of servicing production operations and only then to carry it out.

Basic and servicing production operations should be considered as a single system. This means that the capacities of the servicing part of the system must be in accord with the needs of basic production (naturally, with account being taken of the dynamics of the needs). In this is to be found the essence of the organizational reorganization.

Possibilities of Centralization and Degree of Naturalization

[A.G. Aganbegyan] Shall we take a real look at what is holding back specialization and centralization of ancillary production operations? There are seemingly deep-rooted reasons why directors of enterprises are holding on to a "natural economy," why they are so mistrustful of the creation of an industry of work services.

[D.M. Palterovich, doctor of economic sciences, Economics Institute, USSR Academy of Sciences, Moscow] Centralization of auxiliary services and their specialization are not developing because operational heads are mistrustful of this. They do not want to give up "their" services not because they are bad people but because they do not see how production would be benefited.

[L.D. Karpov] When you come into contact with specialization in practice, you see how complex it is. Let us close all tool shops and turn them over to the Ministry of Machine Tool and Tool Building Industry. Can it alone provide everybody with tools? No, it cannot. As of now it is not ready for this.

In my view, the Ministry of Tractor and Agricultural Machine Building acted correctly in carrying out intersectorial specialization of tool shops, although it is criticized for working with primitive methods. The sector transformed tool shops into affiliates of tool plants with centralized subordination and planning.

[V.P. Yefimenko, chief of All-Union Soyuzpromtekhavtomatizatsiya Industrial Association of the Ministry of Tractor and Agricultural Machine Building] There has already been described in EKO a scheme of organization of centralized servicing of production operations in our sector.[1] Our VPO [possible expansion--vspomogatel'noye proizvodstvennoye obsluzhivaniye = auxiliary production services] are engaged in tool services. Of the other technical-service functions discussed today, we still have ahead of us mechanization and automation of production processes and transport-warehousing operations. Maintenance and power servicing involve other VPO.

Our VPO consists of several specialized tool plants. The remaining tool production operations are included in the association in the form of plants or shops transferred to centralized planning. Neither the director of a plant nor the general director of the association has the right of establishing a plan for them. The plan is provided in a centralized manner by the ministry.

We are attempting to withstand an avalanche of different kinds of tools and mechanization equipment and to maintain it within reasonable limits with the aid of unification and standardization; we are establishing certain norms. This is only becoming possible through centralization.

[L.D. Karpov] And is capital investment for the development of tool production also planned in a centralized manner?

[V.P. Yefimenko] Capital investment is planned in the following manner. There is a five-year plan of development of tool production operations and shops on the scale of the sector. Annual plans are approved on its basis. But capital investment is allocated directly through the subsector. Unfortunately, this is not always done as one would like it and as specified in the plan of development of tool shops.

[D.M. Palterovich] The experience of the U.S. machine-tool industry should be noted. As early as 1958, 45 percent of its production involved the manufacture of metalworking machine tools and 55 percent--tools and equipment; in 1975, the figures were, respectively 40 percent and 60 percent. In our machine-tool building industry, the proportions are reversed. The share of tools remains the same from one five-year plan to another. Fluctuations are within the limits of 0.5-1.o percent, and not always on the side of increase.

Of course, you cannot do away with tool shops and production operations at enterprises. But nonetheless, it is first necessary to create capacities

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1. V.G. Polyanskiy, "On the System of Servicing Specialization in the Sector," EKO, No 6, 1972.

Of course, it is impossible to at once do away with tool shops and production facilities at enterprises. But nevertheless it is necessary first of all to create capacities in the sector, which is the leading one in this direction, and to free them in others. The same applies to maintenance servicing.

The maintenance function constitutes a part of machine-building production. At the same time, it is dispersed among a tremendous number of repair enterprises and shops that are subordinated literally to all of the ministries and departments.

It is impossible to collect in machine building all repair production in one stroke. Quite probably, the question should be resolved with account being taken of the character of equipment (mobile or fixed) and with account being taken of the tremendous inertia of the already created system of maintenance. But nevertheless we have to move in the right direction. What would this direction be?

First, to develop repair associations in machine building itself, such as Soyuzstankoremont of the Ministry of the Machine Tool and Tool Building Industry. But this specialized all-union association performs in its plants a miserly part of capital repair of metal-cutting machine tools (about 2 percent, according to what I was able to establish).

There are literally solitary examples of services at other machine-building enterprises. The Vinnitsa plant of the fuel industry was reported on. It repairs fuel pumps of its own production, having created for this special subdivisions. I consider that this is a progressive way and it ought to be developed without immediately taking away from enterprises repair services but rather creating subdivisions gradually in machine building itself.

Another form is specialization of repair plants of ministries and departments. At the present time, each one has its own plants, and they repair one and the same equipment. Incidentally, a very typical example exists in construction ministries. A tremendous repair base is concentrated in construction, but it is being used ineffectively.

[N.P. Demidov, chief of the Economic Planning Department of Tyumen' Motor Plant] In the aviation industry, there is already being used firm maintenance, or chief maintenance [shef-remont], as we call it. We worked at an aircraft engine with designers, fabricated it, tested it and worked up documentation for repair work. We also keep track of its behavior in operation and make necessary changes in design. During the time of repair we take the engine to the plant. And when we issue one to a user, we assume complete responsibility for its operation.

I believe that for unique equipment, for individual items this is the only possible repair method.

[I.M. Zhislin] The number of specialized service enterprises is increasing in the sectors. Repair trusts in the chemical industry perform 63 percent of the volume of capital repairs. It is true that so far they have not guaranteed anything and are not responsible for anything--neither for the quality, nor the time. They only provide us with workers, who, by the way, are less skilled than our own. But during the period of peak repair loads, during the period of stoppage repairs, we cannot do without them.

[B.I. Lur'ye, chief engineer of Azot Association, Shchekino] The eight trusts for equipment repair that were established in our sector have nothing but manpower, but they take considerable money for their work. We need real repair firms that would assume on themselves the entire responsibility for repairs.

[I.M. Zhislin] The creation of spheres of services should be started with a material-technical base. Only then will it be possible to demand responsibility for the end result. Let us assume that a firm specialized in the repair of compressors. We pay it, and it does everything that is supposed to be done and guarantees the working order of equipment.

In chemistry, regular maintenance plays an exceptionally important role. But contractors will not undertake it, because it is not profitable to them. Whereas they do 60-65 percent of capital repairs, the figure is only 1.5 percent for regular maintenance. For this reason we believe that two-thirds of repair workers should be in the hands of enterprises and the rest with the firms.

[S.A. Shapiro, candidate of technical sciences, chief of a division at the head institute of Kvant Scientific-Production Association, Moscow] Before becoming involved in the improvement of our repair services and determining the degree of their centralization, it is essential to create a scientific system for the development of new equipment and the production of spare parts. When we purchase machinery today from Western firms (I have participated several times in talks relating to the purchase of new equipment from firms in the United States, Switzerland and the FRG), we require of them a list of recommended spare parts and the actual spare parts themselves. We delivery machinery to other countries according to the same procedure. Consequently, it is necessary to introduce for oneself the same sort of obligatory procedure.

It is necessary to oblige developers simultaneously with the output of equipment to provide recommendations for repairs and documentation for the fabrication of spare parts. Then (and only then) will it be possible to resolve on a state scale the question of either production of spare parts at equipment fabricating plants or the creation of specialized spare-part enterprises. Without this we shall always be faced with a growing volume of repair services and primitive methods in the fabrication of spare parts.

[D.M. Palterovich] The need arose for specialized services that would perform functions connected with the technical repair of modern progressive equipment. Machine tools with digital programmed operation are poorly used. This occurs first of all because practically no services or specialists exist that would be capable of repairing machine tools with digital programmed operation and detecting and eliminating defects in them. For the same reason it takes a long time to become familiar with new equipment.

[M.L. Shukhgapter, candidate of economic sciences, Economics Institute, USSR Academy of Sciences, Moscow] We performed new calculations showing the dynamics of auxiliary work in the United States. In 15 years (from the middle of the '50s to the beginning of the '70s), the relative share of auxiliary workers, as calculated according to our method, remained practically unchanged. And this despite a sharp growth in fixed production capital and equipment becoming more complex.

Roughly in the beginning of the '70s the share of auxiliary workers in U.S. industry amounted to 33 percent, including repair workers--about 9 percent and transport workers--approximately the same. Moreover, it seems to us that the last figure is a little high because the calculations include the food industry where transport at many small enterprises takes care of the delivery of finished products.

In the 15 years labor outlays per unit of work performed by auxiliary services have been reduced by 25 percent. An important condition of this is an uninterrupted supply of spare parts for equipment that are especially manufactured in large quantities. They are basically put out by manufacturing enterprises of equipment, specialized enterprises for the production of spare parts and only in a small amount (on the basis of diversification of production)--other machine-building enterprises. I would like to present certain data.

A characteristic feature of the past decade has been the appearance of new "engineering" firms. They obtain from clients an order for equipment, ensure delivery, operation and its future maintenance during the period of operation (adjustment, repair), that is, they assume the entire responsibility for the equipment from beginning to end. They are also responsible for training of enterprise personnel to operate the equipment. This comprehensive servicing system is relatively new; it started to be introduced in the '70s and is now becoming widespread.

In regard to questions of organization of repair work Americans do not have a set scheme. They have the possibility of making use of the services of an expensive specialized firm (during peak situations, for example at the time of capital repairs, when there is a need for a sharp increase in the work force) and one's own reserves.

Production of Spare Parts in the United States, %

	Equipment manufacturing enterprises	Specialized enterprises for production of spare parts	Other machine-building enterprises
For wheel tractors	42	47	11
For conveyor systems	17	67	16
For metalworking equipment	56	33	11
For forging and pressing equipment	20	63	17
For textile equipment	3	91	6
For internal combustion engines	23	64	13

The combination of centralized repair work with specialized, firm repair work and with the repair of certain local equipment and the subordination of repair brigades to an enterprise's chief mechanic are characteristic of Ford plants, ferrous metallurgy and many chemical enterprises. I imagine that this approach ensured the perfecting of auxiliary services at about the same tempo as the main production process.

[A.K. Osipov] It is necessary to first work out centralization and specialization within the enterprise and only then raise the question of taking specialized production operations outside its confines. The idea of creating an independent industry of work services may be possibly correct, but in my opinion it is premature.

Production associations have been created in the country. A new organizational base could serve as the basis for the creation of a rather powerful centralized technical base. When there are repair services, there will also be spare parts.

[Question] What have spare parts to do with this?

[A.K. Osipov] I want to say that each enterprise makes spare parts for repairs. But today it makes them on a lathe located in the main shop. But if a special shop for the production of spare parts was to be created?

[Retort] And this is what you call a "natural economy"!

[A.K. Osipov] Yes, it is bad. But it is better to make spare parts in a big centralized shop than by means of a handicraft method, as they are made today.

[L.D. Karpov] The level of mechanization of the labor of workers in technical servicing is manifestly inadequate. Actually, mechanization has affected only three types of operations: transport-warehousing, maintenance and tool servicing, where the level of mechanization is within the limits of 35-40 percent. The remaining forms of operations are practically not mechanized. According to data appearing in the press, the level of mechanization of the labor of basic works in machine building is 65-70 percent, and the level of equipment with mechanisms is threefold greater than in processes of technical servicing.

How to Coordinate Transport Problems?

[V.S. Konovalov] The thought of gradually bringing out servicing production operations outside the confines of enterprises and creating sectors of work services seems to me to be a very interesting idea. But what do you do with transport services? They need a special approach. Transport within the enterprise is the basis of specialization. Moving of unfinished work pieces and parts in the process of production constitutes an organic part of the production process.

[A.G. Aganbegyan] The rational organization of plant transport for enterprises requires the help of firms in the designing of systems of machines, the development of a technology of movements and the creation of progressive interoperations transporting equipment.

[V.S. Konovalov]. This is true. Help is needed, but strong subdivisions of plant transport are also needed.

[B.I. Lur'ye] Intraplant transport in chemistry consists as a rule of pipes. Hauling of finished products must be done by the Ministry of Railways. But you never can get anything from it! We reduce the output of mineral fertilizers because storerooms are overfilled. There was a time they held up to 21,000 tons. But capacities of warehouses cannot be expanded according to safety regulations...

[K.F. Sirotin, chief of a department of the Kompleks Scientific-Production Association, Volgograd] The Achilles heel of transport-warehousing services and of other auxiliary production operations is their dispersion, disunity. "Better not so good, but at least your own"--dwarf natural operations of industrial transport are established on the basis of this principle. In 1978, the decision was made to transfer amalgamated railroad operations to the Ministry of Railways. The idea was that in this way there would be created an unbroken transport conveyor and then you could expect results. Should the amalgamated operations operate as formerly, namely on the basis of "I will serve whomsoever I wish," then it would be natural for enterprises to be very reluctant to turnover their subdivisions of external transport.

Economists should be more actively involved in the solution of these problems. At present the interests of industrial enterprises and transport organizations do not coincide: enterprises are interested in putting out more products with lower transport totals, while transport workers are interested in providing more ton-kilometers. The press has contained proposals to the effect that mutual interests require combining product production costs with transport expenditures and having this correlation systematically planned. Unfortunately, this problem is not being worked out.

The same applies to motor transport operations. Scattering of motor vehicles among small operations is again in progress. In regard to this question, our ministry has taken a principled position. In the last five years the number of motor transport operations with more than 50 machines has grown to 60 percent of the total number of motor transport operations in the sector. About 40 percent of the motor vehicles are still included in small operations. In 1979 an order for the ministry went into effect, according to which 100 small operations (with up to 10 vehicles) out of 148 would be eliminated.

Very many mobile units are engaged in industrial transport--railroad, motor transport and so on. The lion's share of them serve so-called packing-unit hauls. The mechanization of working them is most difficult (its level is below 30 percent). Due to growing cooperation, the flow of such freight has increased. The only way of improving hauling is through containerization and stacking of these cargoes. Despite this, in 15 years the development of a Statute on Stacked Shipments [paketnyye perevozki] in the Country has still not been completed. A number of documents and recommendations from Gossnab, the Ministry of Railways and the State Committee for Prices mutually exclude each other.

We have organized stacked shipments in our ministry on the basis of intrasectorial cooperation and in the course of three years increased by almost a million tons stacked shipments and also released 500 men from heavy physical labor. But we are unable to move the stacked method further, that is, to intersectorial shipments.

[V.P. Yefimenko] Serious difficulties are being experienced by sectors and enterprises in the solution of transport-warehousing problems because of a shortage of materials handling equipment. There are the ministries that are accountable for the state of railroad and motor transport and for materials handling equipment. But, as can be seen, no specific conditions and economic factors exist that would make it possible to force them to influence the state of the problem. In any case, the Kompleks Scientific-Production Association of our VPO, which is engaged in transport-warehousing problems in agricultural machine building, is developing a technology and a system of machinery for them and has not sensed any help or influence from departments specializing in these problems.

[V.S. Konovalov] The production of materials handling equipment is dispersed among 400 plants of almost 40 ministries! And no one is specifically responsible for it. What can you say when there is no single plan, no accounting, no production base? Each makes for itself without any control. In the Ministry of Heavy and Transport Machine Building, the share of production of materials handling equipment comprises 18 percent and in the Ministry of Road and Construction Machine Building--22 percent.

[D.M. Palterovich] Undoubtedly, there have to be head ministries that disseminate the experience of solving intersectorial problems throughout the entire national economy. Let us take the sector of materials handling equipment. It is obliged not only to produce equipment but also to be responsible for providing the national economy with the necessary products list of machines in sets, to create model plans for organization of materials handling operations for enterprises and to provide consultative assistance in the introduction of materials handling equipment. This must be a sector of specialists not only in the field of production but also in the use of materials handling equipment.

[B.I. Lur'ye] In the improvement of transport-warehousing processes, a big role is played by centralization. In our case, 12-13 years of work have confirmed this. At the association, shops do not write out a single requirement for materials. The supply department together with the chief engineer and the chief mechanic for statistical data established limit cards for all auxiliary materials, metal products, metal, lining and the like. On the basis of these cards centralized delivery of all necessary materials has been organized for the shops. This has produced an economic effect of 50,000 rubles and freed 8 men and 6 tractors. A very important consideration is the fact that the shops no longer are bothered with endless ordering of needs.

In our association, about 4,000 people get special work clothing. Formerly the shops had storekeepers giving this out. Now we have a centralized storage-store. Its personnel issue special work clothing, organize its fitting and maintain accounting cards. This has made it possible to reduce 8 storekeepers in the shops and obtainin an additional 7,500 rubles in yearly savings.

Cadres, Pay, Labor Organization

[V.I. Yefimenko] The development of tool and other auxiliary production operations largely depends on cadres. The pay level of the workers of these services is considerably lower than in basic production. But in order to train a good tool maker or repair worker, a minimum of 3-4 years are required, for a good assembler on the conveyor--a month or two. The assembler on the converyor gets up to 250 rubles a month, a repairman--150-180. And prestige is lost. Formerly, we used to call a tool maker a fitter-pattern maker and spoke of him as a central figure. Today he is in the background. It is necessary to solve cadre problems and questions of pay, and this requires a departure from the concept of "auxiliary worker."

[A.K. Osipov] Nonetheless, he cannot receive other wages because we poorly organize and take into consideration the labor of ancillary workers. This range of questions could be solved through a centralization of services at enterprises and a system of labor organization in servicing production operations comparable to that of the Volga Motor Vehicle Plant.

[L.D. Karpov] What would I do if, as LITERATURNAYA GAZETA says, I were the director? I would select 3-4 qualified engineers to whom I would entrust the computation of economic indicators characterizing the level of development of each type of technical servicing. These indicators would have to consist of four groups: volume of work, number of personnel and level of mechanization, fixed capital equipment and size of expenditures.

Second, with the involvement of a sectorial institute, I would conduct a comparative economic analysis and compare the level of development of processes of technical servicing of my one with related enterprises.

Third, I would equalize not with words but with deeds the processes of servicing with basic production, particularly in regard to the pay of workers of equal qualification and intensiveness of labor regardless of the fact in what shop they might be working.

Fourth, I would do away with the term "auxiliary production" and with uniting under this term different types of work.

[I.M. Zhislin] Another pressing problem is that of evaluating the work efficiency of servicing contracting organizations.

What should be emphasized?

1. No procedure exists of evaluating efficiency of repair work performed by contracting organizations.

2. Labor productivity, volume and other indicators of the work of intraplant servicing production operations and contracting organizations cannot be compared because the former actually keep records on the basis of "net production" and contractors--according to "gross." For this reason materials-intensive work is to their advantage and labor-intensive work to their disadvantage. This incidentally is one of the reasons for the refusal of contracting organizations to do current repairs, which are of special importance to chemical production establishments.

[F.D. Vydra] Actually, inasmuch as servicing firms are not directly subordinated to basic production, enterprise directors are not confident that services can always be obtained on an adequate scale and that objective reasons might not arise to produce a breakdown of servicing. If it were organized at the level of supply of electric power, water or gas, then, of course, there would be no doubts. Incidentally, the example of gas supply and electric supply is proof of the fact that centralized services are possible and efficient in principle. But they must be guaranteed. How to get guarantees from independent servicing production establishments for the best possible servicing of clients and how to interest them in this constitute a most important side of the problem!

I believe that economic theory and practice have so far not provided an answer to the question of how to do this better although a number of good examples exist that show that it is possible to find a solution. I take the liberty of recalling the experience of the association in the repair of tractors in agriculture of Krasnodarskiy Kray. Pay was based on the end result. We paid only when the tractors worked. The quality of repair work improved to such an extent that a whole series of industrial enterprises in the kray wanted to include under this system the repair of scrapers, bulldozers and other comparable equipment. But this system of organization and payment was not supported by the kray's finance organs, and the experiment petered out.

With an evaluation based on the end result, it is simpler to control work quality, the satisfaction of the performers is greater since they themselves see the end result, and it is simpler to organize a rational system of wages. Such a coincidence of interests of the individual, the collective and society permits one to make the conclusion that payment based on the end result is most effective.

[A.G. Aganbegyan] The problems that we are discussing today must be resolved both within enterprises and associations and within sectors, but in their nature they are national-economic. In attaching special importance of this sectory of the economy for the country, the creation of a long-range program for raising the efficiency of servicing production operations becomes more feasible, and it should provide a whole system based on a profound study of the problem. Separately--measures relating to repair work with their specific characteristics, separately--measures for transport-warehousing and loading-unloading operations, tool making and repair operations, adjustment and servicing of technical complex equipment and so on. Separately--general aspects of the economics and organization of servicing production operations, training of cadres, wages and so forth.

Measures, which should be provided for, are not only in the sphere of servicing process. Repairs could be significantly reduced if fixed production funds are renewed in the amount of 2.5 percent on a yearly basis, as is being done, albeit in the amount of 5 percent, in the United States or, in the amount of 6 percent, in Japan, if you take care of the reliability of equipment and so on. Measures are needed on the scale of all industrial production.

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Equalizing Auxiliary and Basic Production

NOVOSIBIRSK EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 10, Oct 79 pp 76-81

[Talk with the deputy general director for economics of ZIL Production Association A.I. Buzhinskiy and the heads of the departments of labor organization and wages V.I. Korneyev and O.A. Vasil'yeva: "What Do You Mean They Are Auxiliaries?!"]

> [Text] One of the largest production associations in the country for the production of trucks--ZIL [Moscow Motor-Vehicle Plant imeni I.A. Likhachev]--is consistently and systematically working on the problem of servicing production operations and has to its credit significant achievements in raising their organizational and technical level. The editors acquainted ZIL's leading economists with the questions discussed at EKO's round table and asked them to express their point of view.

[A.I. Buzhinskiy, deputy general director] First of all, I want to say that the division of production into basic and auxiliary existing today is obsolete. In production facilities with a flow and mass character (motor-vehicle, tractor, agricultural machine-building and others), automation and comprehensive mechanization of processes, introduction of automatic lines and the latest equipment are bound to reduce the relative share of basic production workers among the total number of persons working. This is a logical process.

With modern equipment, tremendous importance must be attached to its adjustment, repair, maintenance in an operating condition. But as of old, we put adjusters and repairmen among auxiliary workers. How could could you consider them auxiliary?!

At large industrial enterprises and associations today, there are in operation tremendous production facilities making tools and nonstandard equipment (using 6,000-7,000 workers--entire plants!). Workers engaged in the manufacture of tools and new equipment and personnel of the plant's TETs come under the existing classification and category of auxiliary workers.

Is this right? The fact is that without power and heat, the plant would not be putting out motor vehicles, that is, its basic product.

The question of classification of production is most important, since it influences the proportions involved in the organization of the production process and gives rise to not always valid requirements to reduce the number of auxiliary workers.

[O.A. Vasil'yev, deputy chief of the Department of Labor Organization and Wages] For example, in one of our mechanized assembly winds, there is a comprehensively mechanized shop for the production of sleeves and pistons. This shop has 10 production workers and 16 adjusters. The shop is fully automated; it has a control system monitoring the course of the production process, which is serviced by electronic workers [elektronshchiki] who are specialists with a secondary technical education. How can you call them auxiliary workers?

At our plant the ratio of auxiliary to basic workers is 2 to 1. But if you exclude from auxiliary workers adjusters (who by the way have norms set in the same way as production workers and solid reinforcement of zones, machine tools and so forth), production workers of auxiliary shops--tool and machine-repair--TETs workers, the ratio will be quite different.

Or another example. We include among auxiliary personnel all the personnel of our experimental production facility, where new equipment is devised. It could have been a large specialized plant! The same applies to the electromechanical shop and others. In our case the ratio between production and auxiliary workers is one that is charecteristic of the entire automotive industry. An objective manifestation of automation and mechanization of production processes is that in the future the relative share of basic production workers will get smaller.

[A.I. Buzhinskiy] The existent classification of production and then the attitude toward auxiliary services damaged their prestige. And this was conducive to a loss of interest to the vocations of tool maker, adjuster, repairworker and to their earnings.

In our view, the rate grouping of tool maker and repairworkers requires the inclusion of a special rate of multipurpose workers [rabochiye-universaly].

[V.I. Korneyev, chief of the Department of Labor and Wages] Servicing operations at the ZIL are organized as follows. The production of tools and nonstandard equipment is centralized. In all the large buildings (the association consists of a number of shops arranged according to the technological principle)--pressing, forging, casting and so on--with workers numbering from 2,500 to 5,000 persons--centralized repair services have been created. The benefits are to be clearly seen. The possibility has appeared of unified planning of repairs (especially preventive planning) and of shifting repairworker personnel around. On this basis, we can create big centralized repair bases and place qualified people at the head of the repair services.

[A.I. Buzhinskiy] We have done a great deal in the field of mechanization of transport-warehousing operation: its level reaches 93 percent. At the plant, the transporting of freight is done without reloading. It is now being introduced at other enterprises of the association.

We wanted to introduce this principle for items obtained through cooperation from other enterprises. We constructed a tall automated warehouse with the most modern equipment, with electronic technology, where everything is based on the principle of shipment of cargo in standardized containers. But we ran into an impossibility of using the non-reloading method of shipment for a number of objective reasons, primarily of an intersectorial character.

We held talks with 100 suppliers of parts for the purpose of getting them to send their products to us in containers and undertook to provide them with our own containers. In this manner the parts loaded in containers would no longer be subjected to reloading and thus come to our tall warehouse and subsequently to the shop, to the work place directly in the container.

What did we learn? Ninety percent of our suppliers were not ready for this. They lack the means of mechanization for loading containers and have organizational difficulties. If they send products to all their customers in wooden crates and only to the ZIL in containers, it becomes inconvient and difficult in practice to carry out, as a different organization of work is required.

Thus the problem of progressive standardization of packing has to be solved on a national economic level. Its production has to be thought out, and types for it would have to be selected. We are of the opinion that containers that can be assembled and taken apart would be the most convenient.

Why are many plants obliged to make their own nonstandard equipment frequently)? Because industry does not fully meet our needs in a centralized manner. There is no doubt that this equipment costs more and labor productivity in such piece production is lower. Today we have at the plant 150,000 meters of different conveyors: overhead, pushing, with programmed control, and so on. We make more than half of them ourselves. Of the 256 automated lines operating in the plant, 100 were designed and made by ourselves.

[O.S. Vasil'yeva] I want to draw your attention to so-called "obsolescent" occupations. Under conditions of shoratage of manpower, this problem is of special importance.

What are these occupations? Cleaning workers, stevedors, washers of windows and skylights, planers, storekeepers. Young workers with a secondary education naturally do not seek such work. There is very little mechanization of such operations, there being no equipment so far to take the place of workers.

This attests to the need for designing small-scale mechanization for such traditionally manual ancillary occupations. Our plant bought with foreign several machines for cleaning production areas. The Volga Automobile-Vehicle Plant also acquired machines. But they cannot be purchased to supply the country. Again the question will run up against problems in regard to repairs and spare parts...

[V.I. Korneyev] At the national-economic level you have the problem of spare parts for equipment. In many cases, their production is not centralized. For this reason all of us are obliged to fabricate them ourselves. This sharply reduced labor productivty in repairs and requires a larger number of repairmen.

The equipment that we obtain from the machine-toold industry not only has no spare parts but also does not have the necessary technical documentation for them. This means that the plants are obliged to keep their designers in the services of the chief engineer, inasmuch as when any part goes out of order, we have to make sense in the case of all diagrams and draw up sketches for the repair.

[A.I. Buzhinskiy] Motor transport obtains spare parts from the sector which manufactures this equipment. But for some reason such duties are not spreading to sectors that manufacture equipment. Moreover, look at our computing center. We get computers without spare parts and write out thick requisitions, which are sent to the manufacturing plants, but they satisfy us only to the extent of 5 percent. Why is it that imported electronic computers always come with a set of spare parts?

We issue without fail all technical documentation, spare parts and all recommendations on how to carry out the repair work. A procedure of this kind should be introduced in machine-tool making and other sectors of machine building.

I would like to direct your attention to another problem. Repair services are poorly provided with small-scale mechanization equipment and mechanized tools. Many operations are still being performed manually. No one is engaged in developing a repair technology and scientific organization of labor.

It is high time to devote attention to this, and the time has come to devise specialized tools that are well and beautifully designed. We need electronic control over the operation of equipment and analysis of its condition, which has been done for a long time abroad. This makes it possible to determine when a machine tool should be repaired or put on preventive maintenance, which in the end raise the labor productivity of repair workers. In our automatic control system we have already set such a task. It helps us to improve the work organization of the repair services and raise the labor productivity of repairmen.

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IMPROVEMENTS SOUGHT FOR PACKING AND STORING SERVICES

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 10, Oct 79 pp 73-76

[Article by Yu.I. Dubrovskiy, Chief, Laboratory for Forecast and Technical and Economic Analysis, Scientific Production Association "Kompleks," Volgograd: "Product Storage Preparation, Packaging--An Indispensable Element of Production."]

[Text] In worldwide practice the packaging of products has assumed great economic importance in connection with the fact that in the present period demands have increased sharply for quality and technical standards of wares. Special packing machines are being created, and total systems of installations with automation of production processes are being developed.

The value of packaging equipment produced by "Common Market" countries in 1976 amounted to 1.1 billion dollars. It is expected that by 1985 the output of this equipment will total 1.5 billion.

On account of peculiar territorial and climatic conditions, expenditures on the production of packing facilities in the Soviet Union are now already greater than in industrially well-developed countries. Total expenditures on the packing of articles constitutes 5 to 8 percent of the value of the production being packed, and in our sector--that of tractor and agricultural machinery-building--it amounts to 4 percent.

A rather significant number of workers in the sector is engaged in packaging and storage-preparation, since the capital-labor ratio in these operations is one-sixteenth of that in basic production. The relative share of mechanization and automation facilities for storage-preparation and packaging consitutes 0.1 percent of the asset portion of funds. A large growth potential in production efficiency lies in increasing the technical level of these processes.

Materials

Formulas for preservative lubricants equal to the best foreign examples have been developed in domestic industry. The problem lies only in their production. This fully applies also to other advanced storage materials--resistant paper, polymer coatings and protective films.

In 1975 our sector used 12,300 tons of preservative materials, including advanced ones: 1,000 tons of liquid inhibitorized lubricants, 1,600 tons of resistant paper, 600 tons of polymer coating-film and others. Demand for low-efficiency lubricant greases comprised 7,300 tons, or 59.4 percent of materials' total volume. This was caused by the extremely inadequate production of preservative materials.

Alteration of preservative materials' structure and use of advanced thin-layered lubricants, whose outlay on 1 square meter of surface being preserved is 4 to 6 times less compared to lubricant greases, promises a significant saving of petroleum products used in their production and is sharply reducing expenditures on the de-slushing of products. However, the petrochemical industry is not supplying the demand for them. Costs of planning their production and lack of economic incentives for their output are much in evidence.

Packing

In its consumption pattern for 1975, wood crating comprised around 80 percent, while abroad it was not more than 16 to 18 percent--and even 4 to 11 percent in the USA and Japan. According to data from sector plants and territorial administrations for material and technical supply, the over-all outlay of lumber for the packing of products of the Ministry of Tractor and Agricultural Machine-building amounted to 1.3 million cubic meters.

Out of the sum total of expenditures on storage and packing, 85 percent goes toward the manufacture and purchase of packing containers. Such substantial expenditures are explained by the relatively high consumption of wood packaging and by the low degree of consolidation of production. Virtually every plant has its own small-scale container shop with deficient production and, as a result, with overstatement of norms for outlay of lumber and violation of State standards and technical conditions for containers.

We carried out calculations which indicated that, on condition of reorganizing the pattern of packaging by virtue of a sharp reduction in wood consumption and introducing packet, bulk and container conveyances, and similarly, by virtue of packaging in corrugated cartons and polymer materials, the total economic effect in our sector could amount to approximately 400 million rubles in the years 1976 to 1990. The Ministry of Paper and Wood-Processing Industry and the petrochemical industry must sharply increase corrugated carton production and the production of polymer and other materials.

Engineering and Processing

Over-all mechanization and automation of packing processes is virtually only being conceived. In the total volume of storage-preparation equipment at sector plants, automated and semi-automated installations, machines and production-lines make up only 8 percent. The situation is approximately the same with packaging equipment. Here, the relative share of advanced installations and machines amounts to 14.7 percent.

The situation which has arisen may be explained by an underestimation of storage-preparation and packaging processes on the part of engineering services and operations managers of enterprises, and by the absence of centralized production of equipment for mechanization and automation of the processes mentioned.

Domestic machine-building enterprises, meanwhile, have been compelled to provide themselves with these kinds of equipment. That which has been manufactured is primitive, and on a technical level it is inferior both to the general level of domestic machine-building and to the best foreign examples. In foremost world practice, the production of packaging equipment is concentrated in a series of specialized firms.

In order to raise the capital-labor ratio of workers engaged in storage-preparation and packaging processes--even if only to 50 percent of the capital-labor ratio level of workers in basic production, it is necessary for our sector to put into operation by 1990 equipment amounting to more than 25 million rubles.

Analogous problems are inherent also in other sectors of domestic machine-building and industry as a whole. This provides grounds for raising the question of creating a specialized all-Union industrial association for the production of packaging and storage-preparation equipment.

Improvement of technical storage-preparation and packaging has great importance also for conservation of labor resources, improvement of working conditions and reduction of heavy manual labor. Through this, in the period up to 1990, around 15,000 persons could be released in tractor and agricultural machine-building. More than 300,000 persons are working only as packagers in the national economy. These figures speak of significant potential for reducing numbers of workers in such processes.

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PLANNING PRODUCTION EFFICIENCY IN TIMBER INDUSTRY DISCUSSED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO)
in Russian No 10,Oct 79 pp 86-97

[Article by N. A. Medvedev, Candidate in Economic Sciences, Chief of an Economic Planning Administration, member of the board of the USSR Ministry of Timber and Woodworking Industry: "Planning and Production Efficiency]

[Text] The timber industry complex has been and continues to be an important part of our domestic economy. It has needed and continues to need optimal planning.

The recently adopted decree of the CC CPSU and USSR Council of Ministers "On Improving Planning and Strengthening the Influence of the Managerial Mechanism on Increasing Production Efficiency and Improving the Quality of Work" proposes a whole range of concrete measures whose realization requires that many things be changed in the branch. The ministry's specialists are making a critical analysis of the situation and are once again evaluating the experience we have gained and our as yet unsolved unsolved problems.

Our Problems

The most acute problems for the branch are such problems as a coordination of consumption and production, the realization of progressive technological solutions and the use of the corresponding equipment, and the intercoordination of the structure of output and raw material, material, and labor resources and production capacities. In brief, a clear normative balance must lie at the basis of the plan.

Unfortunately, there are marked gaps between the individual sections of the plan in the branch. This is especially palpable when we are speaking about the production of round timber materials and the allocation for this purpose of the felled timber fund and about the production of wood shavings slabs and the provision of carbamide resins for this production;

that is, the directive assignments on production are not always backed up by material resources.

The report balance of the consumption of timber materials in the individual branches of the economy is a theoretically highly important plan-forming document. But we do not have this document for the full range of enterprises. For this reason the timber consumption tendencies in the economy are unclear, since without the consumption report balance it is impossible to analyze and evaluate them.

An important element in branch planning is the existence at timber cutting enterprises of timber felling lands in complete accordance with the assortment assignment for the cutting and production of wood and with existing production capacities. However, the timber procurement establishments fell that timber which is assigned by the managerial agencies. And they frequently fell deciduous trees although they have an assignment for coniferous dressed timber.

The assignment as a whole for round wood categories and the plan for the assortments of felled timber are established by Gosplan USSR, while for certain assortments this is done by Gosnab USSR. These state committees ignore such an important circumstance in the work of our branch as the forest lands which have been alloted to us and the variety composition of the timber which has been designated for cutting with regard to the rational cutting of timber. The timber felling fund is not defined in the national economic plan by oblasts and krays and is not divided up according to coniferous and deciduous timber. There is nothing left for the ministry to do but to apportion the assortment plan among its enterprises which do not fulfill it and pay enormous fines to their consumers, have poor economic indicators, and, consequently negligible stimulation funds and so forth. And the guilty ones for this situation turn out to be those who are not guilty -- the heads of timber procurement enterprises.

Their economic work, like the work of the heads of the ministry, is still evaluated according to a chief indicator -- the amount of sold output. Let us assume that the assortment plan and the commodity output plan have been fulfilled. But the railroad has not yet had its say. The output is not moved. And here again the heads of enterprises are at fault: they have ruined the total sales plan. How does the director of a timber procurement enterprise or of an association act? He gives the command to load the railroad cars which have been provided with more expensive assortments of round wood categories or with woodworking products. Less expensive but no less needed timber output is left to lie about until a better time when there will be more railroad cars. This time usually does not arrive and the timber is ruined; millions of cubic meters of it which have already been cut and brought to the railroad and which have frequently been processed are written off and destroyed so as to be replaced by new millions of cubic meters of timber which are threatened with the same fate.

It turns out that we do not have the necessary coordination between national economic interests and the interests of a branch and of an enterprise. Economic and planning levers operate without effect. Through force and administrative pressure we compel enterprise heads to do what is advantageous to the state.

Among the indicators which are approved for associations and enterprises the decree of the CC CPSU and the USSR Council of Ministers "On Improving Planning and Strengthening the Influence of the Managerial Mechanism on Increasing Production Efficiency and Improving the Quality of Work" stipulates an increase in net output (normed), and in individual branches -- an increase in commodity output. The amount of sold output will be approved only in order to evaluate the fulfillment of commitments by enterprises and associations on output deliveries in accordance with contracts.

The heads of our subdivisions still have little interest in economizing live labor. Some of them for good and bad reasons orient their planners toward increasing the size of labor power. The disposition of workers, their employment, and their productivity do not worry many enterprise heads. They know very well that account has to be taken of all kinds of public jobs by their workers and of their diversion to agricultural and other jobs which are imposed upon them by the local authorities. Therefore, it is necessary to have a reserve of workers in the plan. The strained situation with labor resources in the country is not changing the psychology of our leaders of all ranks who are also very well aware of the truth that planning moves "along the base." And the base long ago became the point of departure for every planning worker. There is no point in his presenting his leader with a strenuous plan because the leader thinks: We will reach 100 or 101 percent, but no more, otherwise life will be troubled.

For this reason it is rightly emphasized in the decree of the CC CPSU and USSR Council of Ministers that plans have to be made up on the basis of economic and engineering calculations, and not only on the basis of the developed dynamics of indicators. According to the new procedure of planning a wage norm per ruble of output will be approved in all branches, and also a ceiling on the number of workers and employees and an assignment to decrease the proportion of manual labor.

Experiment in the Branch

During the Ninth Five-Year Plan serious and promising work was begun at the enterprises of the branch to improve the planning of labor and wages with the use of norms. The essence of normed planning consists in the fact that instead of an absolute wage fund, directive norms for the formation of this fund per ruble of commodity output are established for the ministries of the union republics and for associations and enterprises. The new system directly connects monetary remuneration for the labor of workers with the amount of production, more closely coordinates the growth rates of labor productivity and average wages, and excludes violations of planning proportions between them.

In certain cases an overall procedure is used for the planning and issuance of funds for wages in which norms are determined for concrete physical amounts of work and of products. In practice this is done as follows: On the basis of expenditure norms per ruble of commodity output and of planned amounts of commodity output which are established by a superior organization the enterprise forms an estimated wage fund for industrial production personnel (with the separate classification of wages for workers, engineering and technical workers, and employees). On the basis of its technological labor intensiveness and the structure of its elements the enterprise itself approves wage norms for workers per unit of each type of product. Monies are issued by the bank within the limits of a calculated ceiling for the payment of so-called non-worker categories. The expenditure norms for the wages of workers may be enlarged in two groups which are characterized by relative labor intensiveness homogeneity. For example, furniture enterprises employ expenditure norms not for unit products, but for structural groups -- frame, lattice, soft, and children's furniture.

The wage fund which is due to the workers is paid by Gosbank in accordance with norms for the actual amount of the production of each type of output (within the limits of the plan). Wages for above-planned output are determined according to the same rules, but with the use of recalculation coefficients which are established by the ministry in a differentiated manner for each type of output -- within the limits of the average amount in the branch. The amount of a coefficient (from .5 to 1) is determined in relation to the national economic importance of the output in order to stimulate an over fulfillment of planning assignments for the most important and scarcest products.

With this kind of procedure the wages of industrial production personnel, above all of workers, depend not only upon the total (impersonal) amount of the production of commodity output, but also upon its actual structure. The norms create for each enterprise the economic preconditions for the fulfillment of the plan in its entire products list. At the same time, an increase in the production of the most effective types of output is stimulated: products of the highest quality category, export output, consumer goods, and also products made of production waste.

The results of this planning experiment were approved by Gosplan USSR, Gosbank USSR, and the USSR State Committee for Labor and Social Questions. In accordance with a government decision, since 1976 in the ministry as a whole instead of a wage fund, a norm for the formation of this fund per ruble of output is given in the economic plan. Analogous norms have been established for all of our production associations and enterprises. Let us note that now an economy which is obtained compared to the normed wage fund for industrial production personnel can be expended to provide incentives for workers who have achieved above-plan labor efficiency.

However, the method of normative planning is not taking root without difficulty. The point is that at many enterprises of the branch the plan for production of output is fulfilled with difficulty and the cost of output is not decreased which deprives an enterprise of the possibility of creating a real economy in the wage fund. The development of stimuli for an economy of live labor is hindered by the restrictions which remain with the use of Shchekino method. Ministries and enterprises which employ the normative planning method for labor have to be given more rights, and the use by them of an economy of the wage fund must not be limited. There will only be benefit from this: the process of discovering production and labor resources reserves will be accelerated.

Disillusioned with planning the amount of sold output, many enterprises have shifted with the permission of Gosplan USSR and the ministry to such a criterion of evaluating the work as normed net output. This indicator is being used experimentally by 11 large timber industry enterprises and associations. Preparations are being made to use the new indicator by 161 enterprises. The ministry has worked out a special program for planning according to normed net output and when it is carried out all industrial enterprises will transfer to this indicator in 1981-1982.

The realization of this program is closely connected with a system of measures to decrease labor intensiveness. The level of the mechanization of labor in timber procurement production as a whole comes to only 40 percent. Around 600,000 people are employed in manual labor at the enterprises of the ministry. Analysis shows that more than 80 percent of the manual operations lend themselves easily to mechanization. There are especially large reserves for reducing labor intensiveness at auxiliary operations (a 1 percent decrease will free 5,000 workers whose transfer to basic work would increase output by 30 to 40 million rubles).

The entire complex of material stimulation at enterprises has to be constantly improved and the whole system of cost accounting relations in the branch is still functioning insufficiently effectively. Our achievements are still very modest in the introduction of lower level cost accounting. Cost accounting forms in the busiest points of the organizational structure of management (enlarged timber cutting teams and transportation and lower warehouse shops, that is, in those places where the chief problems of production efficiency are solved) are developing slowly.

From Planning "By the Base" to Planning by Norms

It is not possible to achieve intense plans, an improvement in the quality of output, and a decrease in its cost, and an economy of all resources by means of half measures and the modernization of present regulations and instructions. It is time to reject stereotyped planning by base and dynamics. The chief emphasis should be given to qualitative indicators and the production of output in increased demand. The kind of planning system has to be worked out which will make it possible to determine all of the assignments and expenditures for the planning period on the basis of the existing branch norms. An enterprise will then not be afraid to adopt an intense plan. It will know that for the following year also it will have a plan based on a normed calculation. A scientifically substantiated plan is impossible without branch and territorial norms for the expenditure of labor, raw materials, materials, and equipment, for the use of capacities, and for practically all of the sections of the industrial, technical, and financial plan.

In improving out planning mechanism it is essential to understand the relationship between long-term and current planning and the principles of the stability of planning assignments and their judicious refinement (correction). These questions have to do with vital problems which are of sharp concern to every production collective. The point of departure can probably be taken to be, as is provided for by the July decree of the CC of the party and the government, the existence of clear and stable plans for five years (with a break-down by years) for every enterprise, association, and for a branch as a whole.

The instability of plans "erodes" the planning system. This is especially palpable in the extracting branches, particularly in the timber industry. I will explain this thought with the following example.

Capital investments for an expansion of timber procurements, the re-basing of enterprises, and for the construction of roads are extremely important for the development of our branch. The original appropriations for these purposes are frequently cut back during the course of a five-year plan, while the amounts of work remain in the plan. How to perform them without funds is unclear. I believe that when one of the firmly established and intercoordinated indicators is changed it is necessary to change the other. This kind of system of correcting a plan (on a normative basis) will only give it strength, will make it an understandable and mobilizing document, and, consequently, will increase the degree of its reality.

It is of essential importance to improve the development of current plans for a year, quarter, month, and ten-day period. At the present time they are poorly substantiated economically. The fact is that the present industrial technical and financial plans are very cumbersome and labor consuming. They appear in their final redaction at the end of the first quarter. The standard forms of these plans have not been adapted to processing by means of electronic computers. For the enterprises of the branch a multi-variant basis for the composition of plans and the use of mathematical economic methods continue to be a distant theory. The directions of scientific and technological progress still find a weak reflection in the calculation of plans.

Of course, it is impossible to foresee everything in planning, but many years of observation makes it possible to correctly determine quarterly and monthly plans. Yet, it is an ordinary phenomenon for there to be an understatement of economic indicators during the first month and quarters of the year and, especially, of the ten-day, weekly, and daily assignments. Among our leaders there continue to be people who like to place their hopes on the "fifth quarter."

The stability and normed nature of plans and their substantiated corrections (for external reasons) blocks an endeavor to change plans as one takes it into one's head to do so and without justified motivation. In addition, there are indicators in the system of our plans which distort the true situtation. Return on capital and the fee for productive capital may be classified as such indicators. At certain enterprises there is a great deal of idle obsolete equipment, while at others there is an excess of new machines which have been purchased by enterprising leaders to no avail. The ministry does not get letters from these leaders requesting that their excess equipment be transferred. They do not pay for it from their own pockets and all of the expenses arising here will be taken into account in the fianancial plan "by the base." It is necessary to have scientifically substantiated amounts of the fee for capital in relation to the structural, organizational, and other factors of economic activity. And can we speak about the effective use of fixed productive capital if at many enterprises you cannot find such concrete measures as an increase in the shift coefficient, an increase in output per scheduled unit of mechanism, and an improvement of the use of technological lines and production areas?

This also should be planned at enterprises. And in a number of cases it is useful to have in the plan a coefficient of the use of materials and norms of waste and losses and the amount of finished output per unit of raw materials.

Between the Supplier and the Consumer

At one time the problem of price setting was widely discussed. The most radical measures were proposed for bringing order into the complex system of prices, but there is still a mess there today. That which we see in our branch cannot be called shortcomings. They are defects. How else can one characterize the fact that losses are produced in practically the entire timber procurement industry where a completely unsuitable price list is in effect?! A fundamentally incorrect approach to the formation of prices for timber materials has taken shape. The cost accounting factor of a maximum reflection of socially necessary expenditures and a consideration of the structure of the output produced is not present in the system of prices for the output of our industry.

Of course, a "tracking network" is also needed -- a systematic analysis of the prices in effect and of expenditures for production and the level of profitability. However, this has to be a stable system, and not tactical moves in the interests of "patching up holes." In order to create equal cost accounting conditions for enterprises with different profitability levels which operate under dissimilar natural and economic conditions wider use should be made of estimated prices, discounts, and other levers of cost accounting regulation.

One of the most acute problems for the branch is the stable and extremely negative tendency of new equipment to become more expensive. The prices for timber procurement machines and woodworking equipment frequently increase by 2 to 3 times without an actual increase in the real effect from their use. This is a very dangerous course. It not only distorts the financial results and profitability of the consumer branches of new equipment, but also leads to holding back reequipping, a high level of capital and metal intensiveness, and other unfavorable phenomenon. At the same time, the issue is as clear as it can be. Prices for equipment should be established in complete correspondence with a real improvement of its characteristics. The necessity for maintaining an elementary connection between price and effect has been discussed everywhere. But everything is done to the contrary.

Far from everything is in order between consumers and suppliers within the branch itself. The relations, for example, between timber procurers and wood workers who live under a single branch roof are extremely confused because there are middlemen in these relations -- the timber sales and supply organizations of Gossnab USSR -- and because there are transporters -- the railroad workers of the USSR Ministry of Railways. Our middlemen and transporters, it seems, do everything so that our enterprises do not have raw materials (their own!). First, the ministry does not possess a long-term and stable scheme of direct relations between suppliers and consumers within the branch; these relations are dictated by Gossnab, and this limits the economic maneuverability of the branch. Secondly, the ministry does not have the right to intervene in the intrabranch distribution and supply of timber materials and this means that it cannot take effective decisions to supply raw materials to its enterprises on the basis of reserve deliveries. Thus, the branch's headquarters is deprived of the possibility of maneuvering timber materials resources, of influencing an economy and rational use of them, and of achieving rhythmic work between the hundreds of timber procurement, timber sawing, and woodworking enterprises. On the other hand, headquarters has been given unlimited possibilities for applying forceful pressure to enterprises and for rigid control over plans. If one believes that this is the role of a ministry, then everything is all right. But enterprise leaders would like to see and feel the economic role of the ministry -- the complete master of all resources and the organizer of all economic relations. And they are right.

The plan has to serve the goals of social production even better, operate more fully for consumption, and harmoniously tie together the interests of the various elements of economic management on the basis of economic methods of administration. There is no question that the most acute problems of planning in the branch can be solved after the creation of the necessary general economic preconditions. They consist in the following.

1. The entire system of planning indicators and calculations has to be organized on a special-purpose programmed basis, normative methods of forming expenditures and results, a complete balance between the plan and financial, material, and labor resources, and solid connections in the "production, transportation-consumption" chain and also between territories and the branch.

2. There have to be many fewer indicators of economic work than there are now, but indicators which objectively evaluate work, which do not contain internal paradoxes, and which do not create imaginary priorities. It is possible that it would be effective to have two systems of indicators: those which reflect the total national economic effectiveness and those which reflect the local sphere of enterprises.

3. Thought has to be given once again to the kind of system of indicators with which high production growth rates would be combined with an accelerated intensification of the economy.

4. Cost accounting has to be turned into a planning instrument. Today it is unclear where it begins and where it ends, whether it realizes equivalency, and whether it measures the correlation between material stimuli and effect. Most economic executives deserve greater confidence than is now given to them by superior organizations.

5. The concentration of control at intermediate and insignificant positions yields little. In industry it is preferable to have financial bank control which would keep a more active watch over the final result of the work of industrial enterprises.

The decree of the CC CPSU and USSR Council of Ministers which was adopted in July is directed toward all of this. It defines concrete measures for improving planning and maps out the ways to increase the effectiveness of capital investments and raise the role of cost accounting and economic levers and stimuli.

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ARMENIAN GOSPLAN OFFICIAL EXAMINES SHORTCOMINGS, GOALS

Yerevan PROMYSHLENNOST' ARMENII in Russian No 10, Oct 79 pp 47-50

/Article by Yu. Ye. Khodzhamiryan, deputy chairman of the Armenian SSR Gosplan, candidate of technical sciences: "Along the Path of Scientific and Technical Progress"/

/Text/ Soviet Armenia is now a highly developed industrial republic. Such industrial sectors as tool and electrical engineering sectors, instrument making, radio electronics and others, which determine technical progress, predominate among its sectors.

The establishment of a multisectorial network of scientific organizations has greatly contributed to the development of industry. A similar picture is also observed in the sectors of agriculture, construction, transport and so forth.

The Armenian SSR and its national economy have characteristic features, which have left their imprint on the rates and proportions of national economic development during the Ninth and 10th five-year plans and require a close analysis and selection of the best solutions when the trends in economic and social development for the near and distant future are determined. What are these features?

1. The limited areas of agricultural land lead to the fact that in 1975 the share of agriculture comprised only 9.8 percent in the gross national product and by 1980 (even under conditions of a continuous growth of agricultural production) will be lowered to 8.8 percent owing to the higher rates of industrial growth.

In other words, Armenia is primarily an industrial republic. The limited opportunities for the development of agriculture stimulate the further intensive development of industry.

2. The rates and proportions of the republic's national economic development largely depend on demographic characteristics. It should be noted that the increase in labor resources in the republic occurs at quite high rates,

not only owing to the high birth rate, but also as a result of mechanical migration. At the same time, in 1970-1980 the rates of growth of the able-bodied population outstripped the rates of growth of its total size. For example, in 1980, as compared with 1970, the republic's population will increase by 25.8 percent and the able-bodied population, by approximately 49 percent.

3. The available free labor resources (located mainly in small cities, rayon centers and big villages) should be utilized. Industrial development should be carried out according to the best distribution scheme.

4. Located in the south of the country, having limited transport communication with other economic regions and not having sufficient reserves of ferrous metal production, the Armenian SSR should follow the path of development of nonmetal machine building sectors, as well as of overall waste-free processing of available raw material resources.

5. A wide network of higher and secondary specialized educational institutions and a large number of scientific institutes were established in the republic during the years of Soviet rule. In the level of education and availability of highly skilled personnel Armenia occupies one of the first places among the country's fraternal republics.

6. In connection with the republic's limited land resources and characteristics of natural conditions it is necessary to take efficient measures for the specialization and intensification of agricultural production on the basis of development of irrigated farming, further expansion of livestock breeding on an industrial basis, construction of large complexes and establishment of hothouse combines.

7. The republic's limited territory, high percent of urban population, existence of the large Yerevan agglomeration and saturation with industrial enterprises and transport--all this requires special attention to problem of a rational utilization of natural (in particular, water) resources and environmental protection.

Following the decisions of the 25th CPSU Congress and of the 26th Congress of the Communist Party of Armenia and the decree dated 16 April 1975 of the USSR Council of Ministers "On Measures for the Further Development of the Armenian SSR National Economy," the following is to be done in the republic during the current five-year plan: To increase the volume of industrial output by 47 percent; to continue the improvement in the sectorial structure of industry, raising the share of labor-intensive nonmetal industries; to locate enterprises in medium-size and small cities; to continue work on the development of irrigated farming; to increase the efficiency of agricultural production and so forth.

The fulfillment and overfulfillment of the plans of the first 3 years of the five-year plan, for which the republic was awarded the Challenge Red Banner of the CPSU Central Committee, the USSR Council of Ministers, the

All-Union Central Trade Union Council and the Central Committee of the Komsomol, the successful fulfillment of the 1979 plan and the drafts for 1980, which are already available, make it possible to state with confidence that the 10th Five-Year Plan will be fulfilled honorably by the republic's workers. The further intensification of public production, increase in its efficiency, improvement in the quality of output and fulfillment of the plans for the introduction of scientific and technological achievements into the national economy play an important part in this.

The scientists and specialists of the Armenian SSR Academy of Sciences and of a number of sectorial scientific research and planning and design organizations made an important contribution to the cause of the further development of the republic's national economy and to ensuring scientific and technical progress in all its sectors. Investigations of many fundamental and applied problems were conducted successfully. The collectives of the Byurakan Astrophysical Observatory, institutes of radiophysics and electronics, chemical physics, physical research and other institutes of the republic's Academy of Sciences, the Scientific Research Institute of Physics of Condensed Media of Yerevan City University, the Scientific Research Station of the Yerevan Polytechnical Institute and so forth made a weighty contribution to the development of Soviet science.

The introduction of the studies of the Yerevan Scientific Research Institute of Mathematical Machines, the Kirovakan Avtomatika Scientific Research Institute, the All-Union Scientific Research Institute of Polymers, the Scientific Research Institute for Testing Tractors and Agricultural Machinery and many other sectorial scientific institutions greatly contributed to the development of the pertinent industrial sectors.

However, despite the advances made in matters concerning the introduction of completed investigations in a number of applied scientific trends there are many shortcomings in the republic.

Although the necessary laboratory and experimental production base was established for most institutes of applied specialization, often investigations end at the laboratory stage without approval at experimental units and in pilot tests. In many cases completed work is not substantiated economically. As yet there are few registered inventions and licenses have not been sold abroad.

The number of overall studies requiring the efforts of institutes in various fields of specialization, which are most characteristic of and urgent for modern science, is insignificant in a large number of basically urgent problems and subjects on which investigations are conducted in the republic's scientific institutions. As a result, many studies requiring the cooperation of labor of the representatives of allied sciences often remain incomplete.

Under the conditions of the national economy developing at high rates the amount of information necessary for control at the level of directors of ministries, departments and the republic, on the whole, grows in a geometrical progression. In connection with this the need for the development and introduction of automated control systems of various sectors, as well as functional intersectorial automated control systems, is felt with special acuteness.

Following the pertinent decisions of the Central Committee of the Communist Party of Armenia and the Armenian SSR Council of Ministers, the republic's ministries and departments have done considerable work in this direction. The sectorial automated control systems of the Ministry of Light Industry and of the Ministry of Industrial Construction and the Industrial Armelektrosvet Association operate successfully. Many problems connected with intersectorial complexes of the automated planned calculation system, automated system of state statistics and so forth are being solved. On the whole, the number of problems in industrial operation connected with automated control systems with the use of electronic computers exceeds 730 complexes.

At the same time, some ministries and departments do not yet pay proper attention to this urgent aspect of improvement in control. The problems of integration of sectorial automated control systems into a general republic complex are solved slowly and difficulties arise in the development of a data transmission system, the necessary peripheral equipment and so forth.

The above-noted characteristic features and basic problems in the development of the Armenian SSR, the attained scientific and technical potential and the need to further intensify the role of science and new equipment in the solution of key national economic problems---all this formed the basis for the main trends in economic and social development of the Armenian SSR for the 11th Five-Year Plan developed, examined and approved by the republic's directive bodies.

The draft of the main trends in long-term economic and social development for the first time in our practice envisages the use of the program oriented method of planning and outlines the development of overall programs for the solution of the most important general republic and intersectorial territorial problems. The overall programs will intensify the specific orientation in national economic planning and will contribute to the coordination of the goal with the possibilities for realizing it.

What are the basic overall problems, whose solution is especially urgent for our republic?

Provision is made for the development and realization (by the Academy of Sciences and the Ministry of Water Resources with the enlistment of many Union and republic scientific institutions and construction and operating organizations) of an overall program for the protection of nature and an efficient utilization of the natural resources of the basin of Lake Sevan. This program is one of the main components in the set of measures for the fulfillment of the decree of the CPSU Central Committee and the USSR Council of Ministers on Lake Sevan.

For the purpose of increasing the extraction of both the main and accompanying useful components in a commodity concentrate and improving the technique of extracting copper, molybdenum and rare metal products, an overall program for an efficient utilization of the republic's ore deposits will be developed and implemented. Institutes and laboratories of the appropriate specialization, as well as the Administration of Nonferrous Metallurgy, are enlisted in the participation in this program.

The overall program for waste-free processing of nonore material, in the reserves and diversity of which the republic occupies one of the leading places, will be carried out by the scientific subdivisions and enterprises of the Ministry of Building Materials.

The overall program for an efficient utilization of geothermal and heliothermal potentials, which will be developed by a number of academic and sectorial scientific institutions together with geological organizations, aims at searching for and putting new sources of energy into operation.

Overall programs are to be developed and realized for problems connected with increasing the efficiency of capital construction, improving the theory of calculation and design of earthquakeproof buildings and installations and developing and introducing new building materials.

Plans are made to develop overall programs for mechanizing agricultural operations and on this basis increasing the efficiency of agricultural production, developing the unutilized areas of saline soil existing in Armenia, mechanizing the operation and heating of hothouses and so forth.

Plans are also made to expand work on an overall program for the integration of sectorial and functional automated control systems into a republic automated control system with an enlistment of more than 20 scientific subdivisions and computer centers of the Academy of Sciences, Gosplan, ministries and departments in the republic in this work.

The scientific institutions of the Armenian SSR Academy of Sciences, ministries and departments and individual scientific research institutes will conduct research on the most important scientific and technical problems. At the same time, overall specific programs will be developed as needed.

For example, investigations will continue on problems of quantum electronics, the development of new automatic equipment and of methods ensuring its reliability and the creation of lasers, supersensitive spectrometers, sensors and new elements for thin-film electronics and integrated optics.

Plans are made for work on the development of electronic computers of a high productivity on big integrated circuits and small highly productive electronic computers.

A series of highly reliable synchronous generators of a high frequency and of high-frequency electromagnetic transformers will be developed. The development of a set of multiple-point automatic digital instruments for measuring the temperature, digital optimal regulators and so forth will continue in instrument making.

The development and creation of new promising models of machine tools with digital program control, development and improvement of thyristor drives of machine tools and so forth will continue in machine tool building. In the field of chemicotechnological sciences work will be done on the solution of the problem of synthesis of a number of compounds for the development of polymers, on the production of high-melting materials and highly pure substances and on the development of new methods of synthesis for the production of directed medicinal preparations and prescriptions and of techniques of production of new types of rubber and latex.

Investigations will continue in the field of geology and engineering seismology and in different trends in biological sciences and health. The appropriate scientific subdivisions of the Academy of Sciences and higher educational institutions and the Scientific Research Institute of Economics and Planning of the State Planning Committee will work on the investigation of social and economic problems connected with the reproduction of the population and labor resources, expansion of the reproduction and increase in the efficiency of public production and scientific substantiation of the main trends in the development and efficient distribution of productive forces.

A large volume of investigations conducted by institutes of agricultural specialization is envisaged.

In his report at the 25th CPSU Congress Comrade L. I. Brezhnev especially stressed that "... the high-water flow of scientific and technical progress will dry up if it is not constantly fed by fundamental research."

Attaching the greatest significance to the development of fundamental research in the field of natural and social sciences, the republic's Academy of Sciences plans the further expansion of scientific research in the field of mathematics, mechanics, astrophysics, chemistry, biology and other branches of modern science for the future.

In one article it is difficult to cover all the problems and tasks connected with the expansion and intensification of scientific research and introduction of its results into the republic's national economy in the future. However, even from the brief presentation of these problems it becomes clear that during the 11th Five-Year Plan and later the republic's scientific and technical community will face complex and responsible tasks, on the fulfillment of which Armenia's further advance along the path of scientific and technical progress depends in large measure.

The problems of strengthening the connection between science and production and of improving and accelerating the introduction of the results of completed investigations into the national economy become ever more urgent every year.

The outlined plans can be realized only under the conditions of active and creative labor of the entire big army of the republic's scientific and technical workers, a high level of organization of research and introduction of its results on the part of the Academy of Sciences, Gosplan, ministries, departments and scientific organizations in the republic and their close interaction with national economic sectors in the solution of the most important overall problems. Every worker in the republic should participate in scientific and technical progress in the national economy, because, as is noted in the recently adopted decree of the CPSU Central Committee "On the Further Improvement in Ideological and Political-Educational Work," the Soviet man should clearly realize the social significance of his personal participation in the fulfillment of national economic plans and in the acceleration of scientific and technical progress as the decisive condition for further strengthening the homeland's power and the victory of communism."

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COORDINATION OF INTERSECTORIAL BALANCE REVIEWED

Moscow VESTNIK STATISTIKI in Russian No 11, Nov 79 pp 35-42

[Article by L. Gol'denberg: "Some Questions of Coordinating the Indicators of the Summary Intersectorial Balance Sheet"]

[Text] The summary intersectorial balance sheet (MOB; mezhotraslevoy balans) as a component of the balance of the national economy and reflecting the planned nature of socialist production, is characterized by balanced volumes of production and consumption of output in the national economy of the country (and of individual union republics). This statement pertains both to the total volume of gross national product and to the volume of output of individual sectors of the national economy and industry singled out in the summary intersectorial balance sheet.

At the same time, at the stage of compilation of the preliminary version of the summary intersectorial balance sheet a lack of balance in the indicators of this balance sheet is manifested. The lack of balance consists in the inequality of the volumes of resources of the output (column total) and the distribution of output (line total) according to individual sectors of the summary intersectorial balance sheet. In some sectors the volume of resources is greater than the volume of distribution of output, and in others it is the reverse. On the whole for all sectors of industry and the national economy the sum of the inequalities is equal to zero. This is justified if it is considered that the overall, so-called "framing totals" (volumes of gross output, material expenditures, net output, consumption fund, accumulation fund, and others) are taken directly from the balance sheet of the national economy.

Set forth in this advisory are some questions of coordinating the indicators of the summary intersectorial balance sheet.

Lack of balance of the indicators of the summary intersectorial balance sheet as a result of calculations seems to accumulate the errors and individual difficulties of obtaining information which arise at all stage of doing the work to compile the summary intersectorial balance: when filling in the blanks for one-time accounting at studied enterprises, construction projects, institutions and organizations, when determining the results of the totals of the survey, performing several dozens of complex economic calculations, and working out the preliminary version of the summary intersectorial balance. When computing individual indicators of the balance a shortage of information is felt: the current and accounting data utilized in this case are not always accurate.

One of the main reasons for the lack of balance of the indicators of the summary intersectorial balance sheet is the errors when filling in the blanks for one-time accounting directly at the surveyed enterprises, construction projects, institutions and organizations, particularly at industrial enterprises. It should be considered that current bookkeeping at the enterprises is not adapted for filling in the blanks for one-time accounting: for allocation of the volumes of output of the sectorial and non-sectorial type, and also the outlays for its production. In the course of the fiscal year the surveyed enterprises in parallel with current accounting compile special cumulative journals, utilizing the primary documents on the release of materials, the claims for deductions in the expenditure of materials, and others, and they also calculate the output of sectorial and non-sectorial types.

It is pointed out in the instructions for filling in the blanks for one-time accounting and for their work-up that it is necessary to show in the blank for form No. 1 for industrial enterprises the sum of the production prime cost of output of the sectorial type, which then must be added to the profit-loss balance, and the result obtained must correspond to the volume of this output.

However the summary criteria of evaluating the reliability of the survey data do not guarantee against errors in recording the expenditure of individual types of raw materials, supplies, fuel, and components. Errors of this type can arise first of all when calculating the prime cost of output of the sectorial and non-sectorial type; when distributing the auxiliary supplies of the basic shops, and also the supplies issued to auxiliary shops, and those for shop, or general plant expenditures and the expenditures for maintenance and operation of equipment.

It is most expedient to correct the indicated errors, just as many others, at the stage of compiling the cumulative journals, for which also provided is an inspection visit by workers in the statistical administrations of the enterprises surveyed, and a check of the correctness of compiling these journals. In addition, in the statistical administrations to which the surveyed enterprises and organizations send the completed blanks for one-time accounting and where they are developed, it is necessary to have data on the outlays for production in a detailed breakdown of products (sectors) and elements even for the largest enterprises or representatives of the sectors of industry for number of years. It is important to insure succession of the indicators of outlays of the major products for production facilities and enterprises of the same type, the more so because we have started to survey the outlays for production systematically.

The balance sheet coordination of the indicators of the summary intersectorial balance sheet is done in the limits of the "framing totals" taken from the balance of the national product which when balanced should be left without change. This pertains to the volume of gross output, physical outlays and net output by sectors of the national economy, the non-production consumption fund, the accumulation fund and others. The totals for the column "Replacement of withdrawn fixed capital and capital repair" should correspond to the totals for the line "Amortization and underamortized value."

In the summary intersectorial balance sheet the volume of resources of output (column totals) is equal to the volume of gross national product, from which the export-import balance is subtracted (in the summary intersectorial balance the indicators of export and import are given in extended form (the imports in the resource section, and the exports in the distribution section), and added in are the amounts of the recurrent calculation of the trade-transport surcharge (material services of transport, material and technical supply, trade and public catering, procurements) and also the balance of relationships with the budget with respect to agricultural raw material, which is shown in the first quadrant of the summary intersectorial balance sheet. The economic meaning of the latter is in that certain types of agricultural raw material (grain, wool, raw cotton, livestock, poultry, milk and others) are sold to industrial enterprises according to accounting prices, which can differ considerably from the actual purchase prices (particularly for livestock, milk). The difference between the purchase and accounting prices is paid from budget monies through a special account for regulation of prices, if the purchase prices are higher than the accounting prices, or is contributed to the budget if the purchase prices are below the accounting prices.

In the summary intersectorial balance sheet the balance of interrelations with the state budget is shown in the third quadrant in a separate line. The change in net income as a result of the payments of the differences in prices for agricultural raw material is shown at the place where this line crosses the columns of the corresponding sectors of the light and food industry ("Meat and meat products," "Milk and dairy products," "Products of the hulling and milling industry" and others).

In addition, in the summary intersectorial balance sheet the indicators of the balance of interrelations with the state budget regarding agricultural raw material are reflected in the first quadrant, where the interrelations of agriculture and the corresponding sectors of industry are shown. The difference in prices for agricultural raw material should be added (with the appropriate sign) to the outlays for production in those sectors of the light and food industry where agricultural raw material is recorded in accounting prices. Only with such a reflection of the difference in prices for agricultural raw material can the relations of agriculture with industry be shown correctly and can balance sheet equality be attained according to sectors of the intersectorial balance sheet such as "Plant-growing," "Animal Husbandry," "Meat and Meat Products," "Milk and Dairy Products," "Cotton Products," "Products of the Hulling and Milling Industry" and certain others.

The volume of material outlays in the summary intersectorial balance is equal to the amount of them in the gross national product, to which are added the volume of the recurrent calculation of the trade-transport surcharge and the balance of interrelations with the budget, shown in the first quadrant of the summary intersectorial balance sheet.

In the summary intersectorial balances of the union republics the indicators are coordinated both with the indicators of the balance sheet of the national economy, and in the balance sheet compiled for the country as a whole. Reflected additionally in the resource section are the indicators of the import of output from other union republics, and in the distribution part the indicators of export of output to other union republics.

In what sequence should the balancing of the sectors be performed? There is a proposal to perform the balancing of the sectors in the order that is the reverse of the technological process, that is, to begin with the sectors producing the end product and having a small number of relations, and to end with the sectors producing raw materials and supplies. Coordination of the indicators of the resources and distribution of output, beginning with the extracting sectors, is, as a rule, only the preliminary version of balancing the summary intersectorial balance sheet. The experience of compiling summary intersectorial balance sheets for a number of years has shown that such an order of balancing does not have any decisive significance for speeding up this work. In any case it is impossible from the first time to coordinate several thousand indicators of the summary intersectorial balance sheet and it is necessary to work out several versions of balance-sheet coordination. In our opinion, on the contrary, it is more expedient to begin the balancing with those sectors which are characterized by a large number of intersectorial relations. The possible corrections of indicators for these sectors affect the balance of other interconnected sectors.

It is known that during the process of balancing any corrections of the indicators for one sector (besides the corrections along the main diagonal, where the outlays of products of a given sector for the production of output of this same sector are reflected) entail the correction of indicators for other sectors represented in the column and line table of the summary intersectorial balance sheet.

The balancing should be done in the limits of individual groups of sectors, closely connected with one another according to technology of production and so on. We can name as an example the fuel and power complex, which includes deliveries of products of oil refining and the gas industry, coal, fuel shales and peat for the production of electric power at thermal electric power plants, and also the processing of crude oil at enterprises of the oil refining industry; the agro-industrial complex, including supplies of agricultural raw material for production of output in the light and food industry, deliveries of output of the food sectors to the rural economy in the form of fodders (flour, bagasse, molasses, bran, etc.).

Balancing according to each sector includes checking the reliability of indicators of intersectorial relations of the given sector with others. The checking is done both by columns and by lines. Checked by columns are the indicators of the outlays of raw material, supplies, fuel, completing parts for production of output, amortization and underamortized value, elements of net output, the trade-transport surcharge, imports (for union republics, products brought in, including imports). Determined by columns is the reliability of the resources of each sector, and the proportion of material outlays in the volume of gross output.

Checked by lines are the indicators of distribution of the output of the given sector (including output brought in) for production consumption by other sectors in the sphere of physical production, for the consumption fund and the accumulation fund, for replacement of losses (from ceased unfinished construction, the death and destruction of adult and productive livestock and others), for replacement of withdrawn fixed capital, capital repair, other expenditures and export (in the union republics, products shipped out, including export).

The ultimate goal of the balancing calculations is full equality of the indicators of the resources and distribution of output in the limits of the "framing totals" of the balance of the national economy.

Certainly it is not possible to make recommendations on how to do the balancing in each individual case. However, attention should be directed to a number of factors affecting the balanced nature of the indicators of the summary intersectorial balance sheet and having a systematic character.

Identified, as a rule, for the sector "Electric energy and heat energy" is the redistribution of output, that is, the excess of distribution over the resources of the given sector. One of the reasons for the indicated imbalance are the various methods of evaluation used at electric power plants when determining the volume of gross and commodity oupput of the given sector. Used when determining the volume of gross output are uniform (average union) rates, and when determining the volume of commodity output in the effective wholesale prices of the enterprises the actually established rates are used (in the prices of actual sale without the turnover tax). In practice the volume of commodity output for the given sector is greater than the gross output for this sector. The national product (including the output of industry) is determined according to the volume of gross output. This means that in the summary intersectorial balance sheet for the sector "Electric energy and heat energy" the volume of resources turns out to be understated.

In addition, in many cases when filling in the blank for form No. 1 the surveyed industrial enterprises violate the most important principle of recording the outlays for production: the outlays should be reflected without intraplant turnover, that is, without the materials (semimanufactures, products) of in-house production utilized by the given enterprise for industrial-production purposes (not considering the enterprises of a number of sectors of the light, food, coal and timber procurement industries). As a result, during the expenditure of materials of one and the same designation, both acquired from the outside (purchased) and manufactured in-house, some enterprises do not exclude the internal turnover. Such a position is characteristic not only for the sector "Electric energy and heat energy." For instance, machine building enterprises with mass production of tools, forgings, castings and stampings for in-house needs show the volumes of their consumption in the one-time accounting blanks not in the form of individual elements of outlays (metal, fuel, amortization and so on), but together with the volume of analogous output coming from the outside. In order to bring the volumes of resources and the distribution of output into correspondence, excluded from distribution is that part of the electric and heat energy, tools, forgings, and stampings which is produced by the enterprises in the form of intraplant turnover.

In many cases the reason for the lack of balance is that the surveyed enterprises, organizations and institutions incorrectly encode the expended materials, fuel and other types of physical production outlays, and also they incorrectly limit the produced industrial output to output of the sectorial and nonsectorial type. Despite the fact that there are appropriate classifiers, and explanations and so on are given in the single accounting blanks, often the sector affiliation of many products is determined incorrectly, especially of products similar in appearance or having an identical designation, for instance: ferrous metals (pig iron, steel, rolled ferrous metals--summary intersectorial balance code 09), output of intersectorial production facilities (casting, forging, stamping, welded structural parts for machine building--code 40), metal structures (for construction--code 56); hardware for production purposes (code 12) and metal products (code 57); synthetic resins and plastics (code 18) and products made of them (code 19); meat of industrial (code 94) and agricultural production (code 106); the same in terms of milk (respectively codes 95 and 106); individual products of the "Synthetic paints" sector (code 21) and "Products of basic organic synthesis" (code 23); in terms of chemical products of the same name but manufactured by enterprises of different sectors; devices (code 41), household appliances (code 51), output of the radioelectronics industry (code 54) and output of the electrical engineering industry (code 32) and others. As a result of incorrect coding the same types of output are reflected differently for the producers and the consumers. In the process of balancing "parallel sectors," among which for some the volume of distribution of output is greater than the volume of resources, and for others it is the reverse, it follows to perform mutual regrouping of outlays or to change the resources of these sectors.

When balancing the machine-building sectors, the main attention must be given to the indicators which are reflected along the main diagonal and characterize the level of specialization and cooperation of machine building enterprises, and also to the indicators of accumulation of fixed capital and replacement of withdrawn fixed capital, produced in the sectors of machine building, and the indicators of capital repair of machinery and equipment. Correct reflection of these data can have a deciding influence on the balanced nature of the machine building sectors. Let us note that when calculating the volume of accumulation of machinery and equipment according to their types (to sectors of the summary intersectorial balance sheet) there are definite difficulties caused by the absence of the necessary information. The volume of accumulation of fixed capital can be determined in two ways: as the difference in the volumes of capital at the beginning and end of the year according to the residual value, and by deducting from the sum of the volumes of new fixed capital put into operation and capital repairs the sums of the volumes of amortization for the year and the residual value of the capital withdrawn due to dilapidation and wear. The second method is used in the practice of balance sheet calculations. The total volume of accumulation of fixed capital, taken from the balance of the national product, is divided in the process of the calculations by their accumulation in buildings and structures, in machines and equipment. For distribution of the volume of accumulation of fixed capital according to sectors of the summary intersectorial balance sheet the indicators of their accumulation in buildings and structures are attributed to the "Construction" sector, and the indicators of their accumulation in machines and equipment are broken down by sectors of machine building through calculations, using the data of the "Blank for single accounting of fixed capital for 1977" (form No. 2 in industry, and form No. 2-str in construction), and also the given statistics on deliveries of machines and equipment, and the annual report according to form No. 11 (on the presence of fixed capital according to their types), and so on. But all the information mentioned has a great shortcoming: it does not allow the possibility of computing the growth in the volume of fixed capital according to types of machines and equipment with respect to their residual value. This circumstance should be considered when determining measures for balancing the machine building sectors.

In the "Repair of machinery and equipment" sector the lack of balance in the summary intersectorial balance sheet is usually expressed by the redistribution of output (the distribution of output exceeds its resources). Out of all the possible causes for this it is necessary to single out, in our opinion, the two chief causes. First of all, in the first quadrant of the summary intersectorial balance sheet for the sector "Repair of machines and equipment" the line should show the distribution only of that part of the output of repair organizations which is connected with current repair of machines and equipment. Some enterprises, however, erroneously show also the outlays for capital repair of machines and equipment in the make-up of current outlays for production. Meanwhile the cost of capital repair of machinery and equipment, comprising the largest part of the output of the given sector, should be shown in the second quadrant of the summary intersectorial balance sheet, at the intersection of the line "Repair of machines and equipment" and the column "Replacement of withdrawn fixed capital and capital repair." Second of all, not included in the volume of output with respect to repair work is the cost of the purchased parts, sections and assemblies which are used during the repair of motor vehicles, tractors and so on, if the indicated sections, parts and assemblies are not included in the price of the repair according to the price list, although they are paid additionally by the customer. The cost of aggregates and parts paid for by the guarantor-plants above the approved prices for guaranteed repair, is not included in the volume of output with respect to the repair of household machines, appliances, radio and television apparatus produced by enterprises for domestic services to the public in the period of the guraanteed period of operation. In order to bring the indicators of resources and distribution of output into correspondence for the sector "Repair of machinery and equipment," the spare parts, assemblies and parts not included in the price of the repair according to the price list should be added to the volumes of material outlays and the gross output of the given sector.

Let us note that different methods of recording the volume of output and its consumption exist not only for repair jobs, but also for those types of machine building output, the wholesale price of which does not include the cost of completing equipment that is obtained from the outside and is not subject to additional processing and assembly.

When balancing the sectors of the construction materials industry the basic attention must be directed to their relation in the distribution section with the "Construction" sector. Checked in the resource section of these sectors is the sum of the transport surcharge which has a significant proportion in such sectors as "Prefabricated reinforced concrete and concrete structural parts and products," "Wall materials," "Other building materials."

Shown in the column "Products of the timber industry" at its intersection with the line "Forestry" is the whole sum of the per stump payment paid out by the industrial enterprises, and also by enterprises and organizations of other sectors of the sphere of physical production which have engaged in timber procurement. In the sectors of the timber and wood working industries the technological sequence of the intersectorial relations between them should be maintained: the outlays of wood for sawmills, sawn materials for production of products of the wood working industry and furniture, and others.

In sectors of light industry and the food industry in the section of outlays for production the correct reflection of indicators of intrasector turnover, and also of indicators of consumption of agricultural raw material has great significance. These indicators, obtained according to the results of a one-shot survey of the outaays for production, must be checked carefully according to the data of mass statistics.

For instance, an important source of information about the production consumption of agricultural products in sectors of industry in the form of raw material is the report "Consumption and remainders of agricultural raw material" according to form No. 34-sp. The report according to this form is worked out for enterprises of the local, light, food, meat and dairy industries, but it does not cover all the enterprises processing agricultural raw material. Necessary therefore are the corresponding final calculations for the subsidiary industry, for consumer's cooperative enterprises and others. Here it is necessary to add to the value of the raw material processed in industry (shown in the report according to form No. 34-sp) the balance of interrelations with the budget for agricultural raw material. In addition, in order to check the reliability of the outlays in light industry and the food industry it is necessary to use the indicators of the statistical collection "Structure of retail prices for consumer goods for 1977" (for grain, output of the meat industry, the butter and cheese making and the dairy industry, for sugar, for cotton, wool, staple and linen fabrics, grape wine and so on), and the technico-economic indicators of the work of industry (use of raw material in weaving, in the knitting industry, in leather production, in the footwear industry, in the production of bread and flour products and confectionery products, the expenditure of milk for production of milk products, the expenditure of products for production of sausage products, half-finished products and canned goods).

In accordance with the procedure for planning and accounting at enterprises for domestic services to the public in the case of individual sewing and repair of sewn goods, fur and leather products, headgear and textile haberdashery, in custom tailoring and making knitted goods and in the case of certain other types of operations and services, not included in their prime cost (and consequently, in the blanks for one-time reporting by enterprises for domestic services to the public) is the cost of the materials of the customer (fabric, fur, knitted material, yarn, wool). If we speak about the balanced nature of intersectorial relations, then the indicators of personal consumption of the public with respect to sewn, knitted and footwear articles should be increased by the value of the cost of the basic materials, and for fabrics, furs, yarn, wool, and knitted fabric they should be reduced by this same value. With respect to the cost of the customer's materials, it should be added to the outlays of the corresponding sectors of light industry.

For the sectors of agriculture "Plant growing" and "Animal Husbandry" the structure of material outlays obtained as a result of sampling kolkhozes and sovkhozes should be checked in terms of the expenditure of the basic products of industrial production with the data of the annual reports of kolkhozes and sovkhozes according to form No. 6, "Outlays for Production." Beginning with the report for 1975, shown in detail in the report using this form have been the outlays of such products as fuels and lubricants, fodder of industrial production, mineral fertilizers, chemical weed killers, biological preparations and medicines, electric power, solid fuel and gas, spare parts and repair materials and others, separately for production of products of plant growing and products of animal husbandry. Used, in addition, are the indicators of the annual reports of kolkhozes and sovkhozes using forms No. 16 (in terms of expenditure of fodders) and No. 20 (in terms of expenditure of spare parts and repair fee totals).

The outlays of agricultural products (intrasector turnover) in plant growing and animal husbandry in the form of seeds and planting material, the outlays for the fodder of agricultural animals and other production consumption (eggs for incubation, manure for fertilizer, milk for feeding calves and so on) should be collated with the data of the balance of agricultural products in the farms of the producers.

When working out the indicators of the summary intersectorial balance sheet of union republics the balanced nature of the sectors is greatly affected by the reflection of the indicators of bringing in and shipping out products (including the indicators of export and import). Without dealing with the diversity of problems of obtaining such data, we will dwell only on the question of evaluating the indicators of bringing in and shipping out output.

Practically when compiling the summary intersectorial balances of the union republics the sum of bringing output in and shipping it out is indicated according to the wholesale price of industry (including the turnover tax) plus the trade-transport surcharge for delivery of this output to the border of the republic (that is, according to the price "f.o.b. republic border"). The output hauled by transit through the territory of the given union republic is not shown in the summary intersectorial balance as hauling in and hauling out (cost of transit hauls is logically reflected as the export of transport services).

The indicators of hauling output in and out can be computed according to the price of final consumption, including all the outlays on the route of the output from the producer to the consumer, independent of on the territory of which republic they were made. The basic shortcoming of such calculation is the large volume of repeated accounting of the trade-transport surcharge in the cost of output transported in and out, which is clearly evident when summing up these incicators by republics. In addition, with such a method of reckoning problems arise of coordinating the indicators of transporting in and out with the indicators of the balance of the aggregate national product and the national income for the country as a whole and for the union republics.

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